

Education /Qualifications

(1996) Ph.D., Physical Chemistry, *Russian Academy of Science*.

(1991) M.S., Physics, *Institute of Earth Physics of Russian Academy of Science and Moscow Institute of Engineering Physics*.

(1990) B.Sc., Physics (specialization in microelectronics and semiconductor technologies), *Moscow Institute of Engineering Physics, Moscow, Russia*.

Highlights/ Skills

- Rich experience in development of algorithms and codes for a wide variety of applications
- Mathematical statistics, Algorithms, Numerical methods, Optimization.
- Inverse problems
- Fourier transform infrared spectroscopy
- Microwave spectroscopy
- Computer/ Software
 - ◇ Various platforms/systems: Unix/ Linux, Windows , Mac OS
 - ◇ Languages: Fortran 77/90/95, C/C++, Basic, Python, IDL
 - ◇ Other Software: Matlab, Mathematica, MathCAD, Maple, SQL
 - ◇ Hardware
- Parallel computing. Application of large-scale calculations to predict properties of condensed phases in the atmosphere.
- Built a Beowulf Linux cluster on the Tyan Transport /AMD Opteron platform (Trent University)
- Developed and implemented effective parallel codes for satellite remote sensing, Molecular Dynamics, and Monte Carlo simulations.

Professional Appointments

(2000 -Present) Research Associate, Department of Chemistry, University of Waterloo Waterloo, Canada.

Development of methods and algorithms for satellite remote sounding by Atmospheric Chemistry Experiment Fourier transform spectrometer (ACE- FTS). Characterisation of aerosol particles by infrared remote sensing. Molecular dynamics (MD) simulations and thermodynamic modelling of condensed phases at conditions relevant to the study of aerosols and clouds in the atmosphere. MD simulations of aqueous system and vapour-liquid interfaces and their connection to cloud formation. Determination of complex refractive indices of important atmospheric species, including metastable liquids: supercooled water and aqueous solutions of nitric and sulphuric acid.

(1999 - 2000) Research Associate/ PDF, Department of Chemistry, Trent University, Peterborough, Canada.

Molecular dynamic simulations of water and aqueous electrolyte solutions over a wide range of states to probe structures, dielectric response, thermodynamics, and diffusion.

(1991 – 1998), Research Fellow / Senior Research Scientist, Kurnakov Institute of Russian Academy of Science, Moscow, Russia.

Development of new microwave experimental techniques to obtain complex dielectric permittivity of highly conductive specimens in the VHF and SHF frequency ranges (50-200 GHz), algorithms and codes for data analysis. Experimental studies of the dielectric properties for a group of aqueous electrolyte and non- electrolyte solutions.

Research Interests

- Remote sensing of aerosols and clouds
- Molecular dynamics and spectra of atmospheric species
- Formation, evolution, spectra of and phase transitions in condensed phases (aerosols/clouds) in the atmosphere
- Nucleation and crystallization phenomena
- Bulk and interface properties of water and aqueous systems
- Parallel computing, large-scale calculations

Submitted papers

1. A.Y. Zasetsky, S.V. Petelina, R. Remorov, C.D. Boone, P.F. Bernath, E.J. Llewellyn, and J.J. Sloan, Homogeneous Nucleation, Critical Sizes, and Growth Kinetics for Ice Particles in the Polar Mesosphere: A study by ACE-FTS observations, submitted to *the Journal of Atmospheric and Solar-Terrestrial Physics*, 2006
2. A.Y. Zasetsky, K. Gilbert, I. Galkina, S. McLeod, P. F. Bernath, and J.J. Sloan, Properties of Polar Stratospheric Clouds obtained from ACE -FTS and ACE -Imagers extinction measurements, submitted to *Geophysical Research Letters*, 2006

Publications (refereed journals)

3. A.Y. Zasetsky and V. I. Gaiduk, Study of Temperature Effect on Far Infrared Spectra of Liquid H₂O and D₂O by Analytical Theory and Molecular Dynamic Simulations, accepted for publication in the *Journal of Physical Chemistry A*, 2007
4. A. Y. Zasetsky, I.M Svishchev, R. Remorov, Evidence of Enhanced Local Order in Supercooled Water near Liquid-Vapor Interface: Molecular Dynamic Simulations, *Chemical Physics Letters*, 435(1-3), 2007
5. A.Y. Zasetsky, M.E. Earle, B. Cosic, R. Schiwon, I.A. Grishin, R. McPhail, R.G. Pancescu, J. Najera, A.F. Khalizov, K.B. Cook, and J.J. Sloan, Retrieval of Aerosol Physical and Chemical Properties from Mid-Infrared Extinction Spectra, accepted for publication in *Journal of Quantitative Spectroscopy and Radiative Transfer*, 2007
6. M. E. Earle, R. G. Pancescu, B. Cosic, A. Y. Zasetsky, and J. J. Sloan, Temperature dependent complex indices of refraction for crystalline (NH₄)₂SO₄, *Journal of Physical Chemistry A*, 110 (48) , 2006
7. Eremenko M. N., S.V. Petelina, A.Y. Zasetsky, B. Karlsson, C.P Rinsland, E. Llewellyn, and J.J. Sloan, Shape and composition of PMC particles derived from satellite remote sensing measurements, *Geophysical Research Letters*, 32 (16), 2005
8. Remorov R.G., M.W. Bardwell, A.Y. Zasetsky, and J.J. Sloan, Low pressure aerosol flow reactor, *Aerosol Science and Technology*, 39 (11), 2005
9. Eremenko, M. N., A.Y. Zasetsky, C.D. Boone, and J. J. Sloan, Properties of High Altitude Tropical Cirrus Clouds Determined from ACE FTS Observations, *Geophysical Research Letters*, 32 (15), 2005.

10. Zasetsky, A. Y., A. F. Khalizov, M. E. Earle, and J. J. Sloan, Frequency Dependent Complex Refractive Indices of Supercooled Liquid Water and Ice Determined from Aerosol Extinction Spectra, *Journal of Physical Chemistry A*, 109(12), 2005.
11. Zasetsky, A. Y. and J. J. Sloan, Monte Carlo Approach to Identification of Composition of Stratospheric Aerosols from IR Solar Occultation Measurements, *Applied Optics*, 44(22), 4785-4790, 2005.
12. Zasetsky, A. Y., A. F. Khalizov, and J. J. Sloan, Characterization of atmospheric aerosols from infrared measurements: simulations, testing, and applications, *Applied Optics*, 43, 5503-5511, 2004.
13. Zasetsky, A. Y., A. F. Khalizov, and J. J. Sloan, Local order and dynamics in supercooled water: A study by IR spectroscopy and molecular dynamic simulations, *Journal of Chemical Physics*, 121, 6941-6947, 2004.
14. Zasetsky, A. Y., J. J. Sloan, R. Escibano, and D. Fernandez, A new method for the quantitative identification of the composition, size and density of stratospheric aerosols from high resolution IR satellite measurements, *Geophysical Research Letters*, 29, 2002.
15. Zasetsky, A. Y. and I. M. Svishchev, Dielectric response of concentrated NaCl aqueous solutions: Molecular dynamics simulations, *Journal of Chemical Physics*, 115, 1448-1454, 2001.
16. Zasetsky, A. Y. and I. M. Svishchev, Local order in liquid oxygen: computer simulations with point charge model, *Chemical Physics Letters*, 334, 107-111, 2001.
17. Svishchev, I. M. and A. Y. Zassetsky, Self-diffusion process in water: Spatial picture of single-particle density fluctuations, *Journal of Chemical Physics*, 113, 7432-7436, 2000.
18. Svishchev, I. M., A. Y. Zassetsky, and P. G. Kusalik, Solvation structures in three dimensions, *Chemical Physics*, 258, 181-186, 2000.
19. Lyashchenko, A. K., V. S. Khar'kin, A. S. Lileev, A. Y. Zasetkij, and P. V. Efremov, Complex permittivity of low-concentration aqueous solutions of acetone, *Russian Journal of Physical Chemistry*, 74, 529-534, 2000.
20. Svishchev, I. M. and A. Y. Zassetsky, Three-dimensional picture of dynamical structure in liquid water, *Journal of Chemical Physics*, 112, 1367-1372, 2000.
21. Lyashchenko, A. K. and A. Y. Zasetkij, Structural transition to electrolyte-water solvent and changes in the molecular dynamics of water and properties of solutions, *Journal of Structural Chemistry*, 39, 694-703, 1998.
22. Lyashchenko, A. K. and A. Y. Zasetky, Complex dielectric permittivity and relaxation parameters of concentrated aqueous electrolyte solutions in millimeter and centimeter wavelength ranges, *Journal of Molecular Liquids*, 77, 61-75, 1998.
23. Zasetkij, A. Y., A. S. Lileev, and A. K. Lyashchenko, Dielectric-Properties of Nacl Aqueous-Solutions in Uhf-Range, *Zhurnal Neorganicheskoi Khimii*, 39, 1035-1040, 1994.
24. Lyashchenko, A. K., T. A. Novskova, A. S. Lileev, A. Y. Zasetkij, and V. I. Gaiduk, Water Molecule Rotation in Hydrated Shells of Ions and Wide-Band Dielectric Spectra of Electrolyte-Solutions, *Zhurnal Fizicheskoi Khimii*, 67, 1615-1622, 1993.
25. Lyashchenko, A. K., A. S. Lileev, A. Y. Zasetky, T. A. Novskova, and V. I. Gaiduk, Orientational Relaxation in Hydrogen-Bonded Systems - Aqueous-Solutions of Electrolytes, *Journal of the Chemical Society-Faraday Transactions*, 89, 1985-1991, 1993.

Conference Proceedings and Presentations

CAWSES Ice Layer Workshop, May 15-17, Kuehlungsborn, Germany, 2006, *PMC studies with satellites: some results from Odin/OSIRIS, TIMED/SABER and ACE/FTS*, with S.V. Petelina, E.J. Llewellyn, D.A. Degenstein, N.D. Lloyd J.J. Sloan, M.G. Mlynczak, and J.M. Russell.

2005 NASA Solar Occultation Satellite Science Team (SOSST) Workshop, Columbia, Maryland, 6-9 June 2005, *Properties of Polar Stratospheric Clouds from Coincident POAM III and ACE FTS Solar Occultation Measurements*, with E.P. Shettle, M.N. Eremenko, M.D. Fromm, and J.J. Sloan

ASSFTS 12 workshop, Quebec, Canada 18-20 May, 2005 *“Characterization of atmospheric aerosols and clouds by IR remote sensing: Applications to the ACE-FTS observations”*, with M. N. Eremenko, and J.J. Sloan

AGU 2004 Fall Meeting, Moscone Center, San Francisco, California 13-17 December, *“Uptake of Organics by Water Aerosols Measured in a Low Pressure Aerosol Reactor”*, with R.G. Remorov, M.W. Bardwell, and J.J. Sloan; *Particle Size Distributions and Densities of Tropical Cirrus Clouds Observed by the ACE FTIR Instrument on the SciSat-1 Satellite*, with M.N. Eremenko, and J.J.Sloan; *“Internal Structure in Supercooled Water Aerosols and Their Role in the Formation of Ice Clouds”*, with A.F. Khalizov, M. Earle, and J.J. Sloan

ACS Symposium on Chemical Physics in Atmospheric Science, 22-26 August 2004, Philadelphia, PA, USA: *“Long Range Order in Supercooled Water Aerosols”*, with A.F. Khalizov and J.J. Sloan

Gordon Conference on WATER & AQUEOUS SOLUTIONS (2004), Holderness School, Plymouth, New Hampshire, USA, Aug 1-7, 2004: *“Local Heterogeneities and Dynamics in Supercooled Water: A Study by IR Spectroscopy and Molecular Dynamic Simulations”*, with A.F. Khalizov and J.J. Sloan

CHEMICAL PHYSICS RESEARCH SEMINAR, University of Waterloo, March 12, 2004, *“Spatial Heterogeneities and Dynamics in Supercooled Water”*

Department of Physics & Atmospheric Science, Dalhousie University, February 11, 2004 *Quantifying Atmospheric Aerosols from IR Measurements: Simulations, Testing, and Applications*

AGU 2003 Fall Meeting, Moscone Center, San Francisco, California 8-12 December *“Chemistry and Physics of Lower Stratospheric Aerosols Determined by Satellite Remote Sensing”*, with A.F. Khalizov and J.J. Sloan

Gordon Conference on ATMOSPHERIC CHEMISTRY (2003), Big Sky Resort, Big Sky, Montana, *“Chemical Compositions and Physical Properties of Polar Stratospheric Clouds Determined by Solar Occultation Measurements from Space”*, with J.J.Sloan

SPIE 48th Annual Meeting (2003), 3-8 August, San Diego, California, USA: *“Characterization of composition, size and density of atmospheric aerosols from high resolution IR satellite measurements”* with J.J. Sloan

ILAS group seminar (2003), National Institute for Environmental Studies, Tsukuba-Shi, Ibaraki, 305-8506 Japan *“Characterisation of Composition, Size and Density of Atmospheric Aerosols”* with J.J. Sloan

EGS-AGU-EUG Joint Assembly (2003), Nice, France, 06 - 11 April *“A method for the determination of the chemical composition of polar stratospheric clouds using observations from space”* with J.J. Sloan

AGU 2002 Fall Meeting, Moscone Center, San Francisco, California 6-10 December *“New Methods to Determine the Chemical Compositions and Physical Properties of Atmospheric Aerosols from Infrared Spectroscopic Measurements”* with J.J. Sloan

Gordon Conference on ATMOSPHERIC CHEMISTRY (2001), SALVE REGINA UNIVERSITY NEWPORT, RI, JUNE 17-22, 2001: *“The Chemical Composition of Atmospheric Aerosols from Broadband IR Satellite Measurements”* with D.B. Dickens, T. Kurosu and J.J. Sloan

Gordon Conference on WATER & AQUEOUS SOLUTIONS (2000), Holderness School, Plymouth, New Hampshire, USA, Aug 6-11, 2000: *“Dielectric response of aqueous electrolyte solutions”* with I.M. Svishchev

Gordon Conference on WATER & AQUEOUS SOLUTIONS (2000), Holderness School, Plymouth, New Hampshire, USA, Aug 6-11, 2000: *“Solvation dynamics of oxygen in supercritical water”* with I.M. Svishchev,

Gordon Research Conference on Chemistry and Physics of Liquids (1999), Holderness School, Plymouth, New Hampshire, USA, August 1-6, 1999: *“Spatial picture of density fluctuations in water.”* with I.M. Svishchev

Dr. Alexander Zasetsky
Tel. 1-(519)-888-4713
Fax. 1-(519)-746-0435
E-mail: azaset@sciborg.uwaterloo.ca; zasetsky@rogers.com

Department of Chemistry
University of Waterloo
200 University Ave. West, Waterloo
ON, Canada, N2L 3G1

References

Dr. Peter Bernath
Professor, Department of Chemistry
University of York, Heslington
York YO10 5DD, UK

Phone: +44-(0)-1904-434526
Fax: +44-(0)-1904-432516
E-mail: pfb500@york.ac.uk

Dr. Edward J. Llewellyn
Professor, Department of Physics and Engineering Physics
University of Saskatchewan
116 Science Place, Saskatoon,
Saskatchewan, Canada, S7N 5E2

Phone: +1 306 966-6441
Fax: +1 306 966-6400
E-mail: edward.llewellyn@usask.ca

Dr. Rafael Escribano
Inst. de Estructura de la Materia, CSIC
Serrano, 123 - 28006 Madrid

phone: (34) 91590 1609; (34) 91561 6800 ext 1125
fax: (34) 91585 5184 ; (34) 91564 5557
e-mail: rescribano@iem.cfmac.csic.es

Dr. Igor M. Svishchev
Professor, Department of Chemistry
Trent University, Peterborough, Ontario K9J 7B8, Canada

phone: (705) 748-1063
fax: (705) 748-1625
e-mail: isvishchev@trentu.ca